# Telecommunications Engineering, Analysis, and Modeling

The Telecommunications Engineering, Analysis, and Modeling Division conducts studies in these three areas for wireless and wireless-wireline hybrid applications.

**Engineering** includes assessment of the components of telecommunications systems; evaluation of protocol and transport mechanism effects on network survivability and performance; and assessment of the impact of access, interoperability, timing, and synchronization on system effectiveness in national security/emergency preparedness (NS/EP), military, and commercial environments.

**Analysis** is often performed in association with Telecommunications Analysis (TA) Services, which offers analysis tools online via the Internet. In addition, ITS can provide custom tools and analyses for larger projects or specialized applications.

**Modeling** is one of ITS' core strengths. Propagation models are incorporated with various terrain databases and data from other sources, such as the U.S. Census. Adaptations of historic models, and those for more specialized situations have been developed, enhanced, and compared. ITS engineers contribute their propagation modeling expertise to the ITU as well.

Our wireless test facilities and research capabilities allow ITS engineers to examine 2.5G and 3G technologies in detail. The Wireless Networks Research Center (WNRC) in combination with the 802.11 outdoor testbed can accommodate studies of emerging technologies and PCS, analysis of wireless protocols, and studies of wireless network effects, e.g., congestion, and capabilities, e.g., priority access. (See page 69 for information about the WNRC and page 63 for information about the wireless links at Green Mountain Mesa.)

## Areas of Emphasis

### ENGINEERING

**PCS Applications**

The Institute participated in the transition from Telecommunications Industry Association (TIA) committee TR46.2 to the Alliance for Telecommunications Industry Solutions (ATIS) subcommittee G3GRA (Radio Aspects of GSM/3G and Beyond). ITS is developing PCS interference models in a project funded by NTIA.

**U.S. Coast Guard Rescue 21 Technical Consulting**

The Institute assists the U.S. Coast Guard in testing and evaluating its new communication capabilities by acting as a third-party technical consultant. The project is funded by the U.S. Coast Guard.

### ANALYSIS

**Telecommunications Analysis Services**

The Institute provides network-based access to research results, models, and databases supporting applications in wireless system design and evaluation. These services are available to government and non-government customers and are funded by fee-for-use and fee-for-development charges through an on-line CRADA.

**Geographic Information System Applications**

The Institute continues to develop a suite of Geographic Information System (GIS) based applications for propagation modeling and performance prediction studies. This work is funded by the DoD.

### MODELING

**Broadband Wireless Standards**

The Institute develops new radio propagation algorithms and methods that improve spectrum usage of wireless systems. Technical standards are prepared that support U.S. interests in third generation (3G) broadband wireless systems. The project is funded by NTIA.

**Propagation Model Development & Comparisons**

The Institute compares and harmonizes existing propagation models, to improve their predictive accuracies and reduce the differences between their predictions. This project is funded by NTIA.